

**The Department of Defense Awards Program for
Excellence in Performance Based Logistics
Nomination – Section 2**

Background: Two F404 engines power the Navy's front line fighter and attack aircraft, the F/A-18 Hornet. The F404 engine maintenance program has historically presented significant challenges to the Naval logistics community, as its maintenance is highly decentralized, requiring Organization (O), Intermediate (I), and Depot level coordination to deliver a high level of combat readiness.

Problem Statement: The scale of F404 program support effort is massive: 1,862 engines in service powering 755 F/A-18 airframes, all of which had been maintained within the Navy organic repair infrastructure since F404 program inception two decades earlier. In order to be successful, and deliver extended levels of time on wing powerplant performance, O and I level F404 maintainers require an uninterrupted supply of reliable and economically priced engine components.

Contribution:

The Team

The Navy/GE F404 Performance Based Logistics (PBL) Team is an Integrated Process Improvement team chartered in 2001 and tasked with delivering improved "Time on Wing" for F404 engines installed in F/A-18 combat aircraft. The team is comprised of professionals with four areas of expertise: Supply Chain Management, Engineering, Acquisition, and Material Budget. The Team researched, analyzed and reinvented the many segments of the supply, repair and support process that provides aviation engines to F/A-18 operators. Their efforts delivered the improved ready for issue component availability, up from <50% to 92% first pass fill rate, and reduced Repair Turn Time

(down from 120 to 47 days) to Navy customers, while growing component life limits by an average of 20%.

Supply Chain Reinvention

The F404 PBL Team re-engineered the material supply/maintenance chain that extends from Navy weapon operator, through NAVICP, to the depot level aviation engine repair facility. The PBL Team's efforts resulted in award of a requirements type contract and development of an industrial partnership agreement with a base performance period of four and one-half years that covers the total repair or replacement requirement for 36 internal engine components. The industrial partnership teams the NAVICP, the Naval Aviation Depot NADEP, Jacksonville, Florida, and General Electric Aircraft Engines (GEAE), the Original Equipment Manufacturer (OEM) of the F404 engine. Establishment of the fixed price PBL contract to deliver component support to the F404 community reduced Fleet total ownership cost by \$79M or 13.8% during the initial term of the contract. This cost savings is strictly the price of legacy support less the fixed price of PBL performance. Savings associated with the more timely and responsive logistic support that the PBL delivers, such as reduced maintainer effort at Fleet Operating sites and Intermediate maintenance facilities, or longer weapons platform operating cycles driven by a more robust supply of higher life components, will generate additional savings of time, effort and material for Navy operating forces.

Maintenance Process Modification

The logistics and acquisition subject matter experts aboard the F404 PBL Team drafted a contractual framework that leveraged the aircraft engine Prime's integrated, flexible, and worldwide commercial supply/maintenance chain. The PBL contract

harnesses the single integrator approach to the many tasks supporting component repair at the Navy Depot. The F404 Team's work statement as executed by the 17 July 2003 contract award drives significant changes to support strategies and techniques including:

1. Screening of retrograde carcasses prior to repair line induction to determine depth of repair and finite piece part requirements.
2. Kitting of required piece parts with retrograde carcass prior to repair shop insertion.
3. Elimination of teardown, testing, and back shop bottlenecks for key assemblies.
4. Implementation of production build specifications whose optimum parts-matching strategy improves depot production output while delivering maximum engine and module usable life.
5. Establishment of sub assembly "supermarkets" containing a greater depth and breadth of parts than stocked under the legacy repair process. This allows continuous repair production and optimal parts life management without any piece parts investment or parts obsolescence risk borne by the Government.

Leveraging Commercial Best Practices

The F404 PBL Team's contract delivers improved logistics support by restructuring the way F404 engine components are acquired, overhauled and maintained. The agreement combines the engine OEM's unique logistics management skills with the Navy repair depot's facilities and artisan work force. Engine component repair is executed under a firm fixed price contract against a schedule of performance metrics. Exceptional Contractor performance is rewarded, while sub optimal periods of supplier performance reduce the supplier's profit margin.

The F404 PBL Team's acquisition vehicle improves availability of F404 components using a five-prong approach:

1. Maximize the productivity of NADEP Jacksonville artisans by technology insertion into planning, industrial processes and production facilities.
2. Streamline the supply chain and increase the availability of raw materials and piece parts on hand in support of engine component repairs at NADEP without increased investment.
3. Incentivize the commercial contractor, General Electric, to implement commercial best practices such as its "Lean" commercial repair processes and OEM 3PL supply chain expertise at the Navy's Jacksonville Repair Depot.
4. Incentivize reductions to repair turn around time, Logistic response time, component work in process and Fleet backorder count.
5. Implement real time PBL requisition processing, carcass tracking and order fulfillment transaction flow that is transparent to the Fleet operator.

Acquisition Process Improvement

The F404 Team cross-trained its membership so that all aspects of superior logistic support were incorporated into the F404 PBL. The contract also provides for a seamless and aggressive transition period, during which legacy Depot component repair operations are converted from organic management into commercial repair activities for which the PBL Prime subcontracts for touch labor using his Navy Depot partner. The F404 contract specifies both transitional and full performance metric criteria tied to monetary incentives and disincentives. The F404 PBL Team designed and awarded the F404 PBL contractual vehicle, a performance based, fixed price agreement, the type identified as most

advantageous by both Department of Defense and Department of the Navy leadership. The F404 PBL contract drives maximum performance on the part of the commercial provider while stabilizing the monthly and annual cost to the Government of component repair because of its fixed price terms. The reengineered supply support and repair production processes developed by the F404 Team have already been exported and applied to other depot component repair programs (J52, T64, TF34, T700) managed by the NAVICP Aviation Engine IWSST, and these strategies are being scaled up for application to whole engine or module repair lines in Operations to Depot level maintenance environments.

During the first two years of F404 PBL performance, all required contractual performance metrics have been exceeded and all the following performance milestones have been achieved:

- Delivering 99% first pass material availability on all Fleet requisitions (up from the 50% range);
- Reduced Fleet backorders by 100%, from 718 to 0;
- Reduced high priority (Issue Group One) backorders by 100%, from 436 to 0;
- Reduced depot work in process from 1,264 to 35 carcasses via streamlined industrial processes.

The F404 Aircraft Engine PBL Team has delivered improved Navy warfighter support by utilizing innovative logistic, maintenance and acquisition strategies. Their process analysis and reinvention efforts resulted in a fixed priced agreement that delivers an inclusive supply chain solution for support of Navy F404 engine components, increased Fleet material availability, and reduced cost to the Navy.

**The Department of Defense Awards Program for
Excellence in Performance Based Logistics
Achievements – Section 4**

Proposed Citation: The Navy/GE F404 Aircraft Engine Performance Based Logistic (PBL) is recognized for their exceptional warfighter focus and process innovation demonstrated while reinventing the logistic supply chain that supports the Navy's front line fighter aircraft, the F/A-18. The Team's nine and one-half year term, \$510M F404 PBL contract restructures the way the aircraft's F404 engine components are acquired, managed, overhauled, and maintained. The F404 PBL delivers maximum combat aircraft availability while minimizing operator maintenance. The initial two years of PBL performance provided a 92% requisition fill rate (up from a < 50% legacy rate) at a 13.8% price reduction. The Navy estimates total savings for the four and one-half year base contract performance period is \$79M less than the anticipated cost of organic Depot repair for the same period. The team has leveraged the commercial best practices and worldwide resources of its private industrial partner, General Electric Aircraft Engines, and the extensive facilities and artisan workforce of its organic facilities partner, NAVAIRSYSCOM's Naval Depot Jacksonville, to deliver an innovative supply support solution that has delivered measurable readiness improvements and cost savings to the Fleet. The F404 engine currently stands at its highest level of combat readiness and customer satisfaction since its introduction to the Fleet.